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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/841,171

04/25/2001

Shigehide Kuhara

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09/09/2004

NIXON & VANDERHYE, PC  
1100 N GLEBE ROAD  
8TH FLOOR  
ARLINGTON, VA 22201-4714

EXAMINER

VARGAS, DIXOMARA

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/841,171	<b>Applicant(s)</b> KUHARA, SHIGEHIDE	
	<b>Examiner</b> Dixomara Vargas	<b>Art Unit</b> 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 2-13, 15-21 and 23-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-13, 15-21 and 23-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2001 and 14 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>07/07/04</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/07/04 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2-13, 15-21 and 23-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Englund et al. (US 5,197,474) in view of Wang et al. (US 5,928,148) and in further view of Jakob et al. (US 6,289,232).

With respect to claims 2 and 24, Englund discloses the predetermined direction is a longitudinal direction of the couch, positions of the plurality of RF coils in the predetermined direction are fixed to a position of the couch, and the position changing unit is configured to move a position of the couch in the longitudinal direction relative to the static magnetic field generating means fixed (as shown on Figure 1).

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4. With respect to claims 3 and 31, Englund discloses the unit configured to change the position so that a center position of each of the plurality of RF coils in the longitudinal direction corresponds to the uniform region of the static magnetic field (Column 5, lines 17-28).

5. With respect to claim 4, Englund discloses the selection means for automatically selecting, from the echo signals received by each of RF coils, the echo signal received by a certain RF coil located at the center of the uniform region in the longitudinal direction, an output of the selection being routed to the image producing unit (Column 5, lines 3-28).

6. With respect to claims 5, 25 and 32, Englund discloses the claimed invention as stated below in paragraph 8 except for the selection means comprising signal level detecting means for detecting a level of the echo signal received by each of the plurality of RF coils; and signal selecting means for automatically selecting the echo signal received by the RF coil located at the center of the uniform region in the longitudinal direction based on changes in the level of the echo signal detected by the signal level detecting means. However, Wang discloses selection means comprising signal level detecting means for detecting a level of the echo signal received by each of the plurality of RF coils; and signal selecting means for automatically selecting the echo signal received by the RF coil located at the center of the uniform region in the longitudinal direction based on changes in the level of the echo signal detected by the signal level detecting means (Columns 4-5, lines 16-67 and 1-20 respectively; Figure 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Englund's MRI system with Wang's teachings about a selection means comprising signal level detecting means for detecting a level of the echo signal received by each of the plurality of RF coils; and signal selecting means for automatically selecting the echo signal received by the RF

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coil located at the center of the uniform region in the longitudinal direction based on changes in the level of the echo signal detected by the signal level detecting means for the purpose of selecting the signal with the highest amplitude which constitutes the signal of the region of interest of the examined subject and transform the signal into an image of the selected preferred area.

7. With respect to claim 6, Englund discloses the claimed invention as stated below in paragraph 8 except for an identification generating unit configured to generate an identification number of each RF coil, the identification generating unit being disposed at each of the plurality of RF coils, a size memorizing unit configured to memorize a size of each of the plurality of RF coils in the longitudinal direction, the size corresponding to the identification number of each RF coil generated by the ID generating unit, a disposal detecting unit configured to identify each signal line of the plurality of RF coils so as to detect a disposal state of the plurality of RF coils in the longitudinal direction, and a determination unit configured to determine the size based on detection information about the coil disposal state detected by the disposal detecting unit and providing the size to the size memorizing unit, wherein the position changing unit includes means for moving the position of the couch based on the size determined by the determination unit, and the reception unit includes selection means for automatically selecting, from the echo signal received by each of the plurality of RF coils, an echo signal received by the RF coil located at the center of the uniform region in the longitudinal direction on the basis of the size determined by the determination unit and the coil disposal state detected by the disposal detecting unit, the detected echo signal being provided to the image producing unit. However, Wang discloses an identification generating unit configured to generate an identification number

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of each RF coil, the identification generating unit being disposed at each of the plurality of RF coils, a size memorizing unit configured to memorize a size of each of the plurality of RF coils in the longitudinal direction, the size corresponding to the identification number of each RF coil generated by the ID generating unit, a disposal detecting unit configured to identify each signal line of the plurality of RF coils so as to detect a disposal state of the plurality of RF coils in the longitudinal direction, and a determination unit configured to determine the size based on detection information about the coil disposal state detected by the disposal detecting unit and providing the size to the size memorizing unit, wherein the position changing unit includes means for moving the position of the couch based on the size determined by the determination unit, and the reception unit includes selection means for automatically selecting, from the echo signal received by each of the plurality of RF coils, an echo signal received by the RF coil located at the center of the uniform region in the longitudinal direction on the basis of the size determined by the determination unit and the coil disposal state detected by the disposal detecting unit, the detected echo signal being provided to the image producing unit (Columns 4-5, lines 16-67 and 1-20 respectively; Figure 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Englund's MRI system with Wang's teachings for the purpose of selecting the signal with the highest amplitude which constitutes the signal of the region of interest of the subject with the selected coil that is enable depending on the size of said coil which covers the area to be examined and transform the signal into an image of the selected preferred area.

8. With respect to claims 7, 11, 20, 23, 29, 36 and 37, Englund discloses a magnetic resonance imaging system, as seen on Figure 1, comprising: static magnetic field generating

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means for generating a static magnetic field containing a uniform region whose magnetic intensity is uniform (Column 4, lines 42-45; Figure 1, #6); a couch movable in a predetermined direction passing through the static magnetic field, an object to be imaged being laid on the couch (Column 4, lines 14-26; Figure 1); a reception RF coil arranged fixedly to the static magnetic field generating means (Column 1, lines 5-11; Figures 1 and 4); position changing means for automatically changing a relative position between the couch and the static magnetic field generating means in the predetermined direction when the object is under imaging (Column 4, lines 26-45; Column 3, lines 3-21); scanning means for scanning the object by transmitting an RF pulse to the object at different positions of the couch with respect to the static magnetic field generating means, the different positions determined by the position changing means, the scanning including an imaging scan and a measuring scan to determine sensitivity distributions of the reception MR coil at the different positions (Column 1, lines 19-32); reception means for receiving through the RF coil an echo signal in response to the scanning performed by the scanning means (Columns 5 and 6, lines 58-61 and 1-5 respectively).

Englund discloses the claimed invention except for the reception processing means for processing the echo signal received by the reception means into echo data; image producing means for producing an MR image from the echo data obtained in response to the imaging scan at different positions of the couch changed by the position changing means. However, Wang discloses means for processing the echo signal (Figure 1, #106 and # 104). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Wang's means for processing the echo signal with Englund's MRI system for the known purpose of transforming the data to a computer readable data and convert the data into a displayable data

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for a monitor and allow the system user to visualize the signal resulting from the examination for studying the imaged part of the body.

Also, Englund discloses the claimed invention except for the unfolding performing means for unfolding the MR image produced in response to different positions of the couch using the echo data of the sensitivity distributions obtained at different position of the couch determined by the position changing means. However, Jakob discloses the use of the unfolding performing means (Column 21, lines 2-58). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Jakob's unfolding performing means with Englund's MRI system for the purpose of obtaining a faster full field-of-view image with the ghost artifacts suppressed and separating the desired components of the signals from the undesired aliased components.

9. With respect to claim 8, Englund discloses each of the plurality of RF coils comprising the multiple RF coil is an array type of RF coil having a plurality of coil elements (Abstract).

10. With respect to claims 9, 13, 27 and 34, Englund discloses the claimed invention as stated above in paragraphs 3-8 except for each of the plurality of coil members constituting the multiple RF coils is a whole-body coil. However, Wang discloses said whole-body coil (Figure 1, #152). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Englund's MRI system with Wang's whole-body coil for the purpose of improving the system by increasing the possible number of body parts or imaging volume to be examine by covering the entire body of the patient.

11. With respect to claims 10, 28 and 35, Englund discloses the multiple RF coil is fixed to one of the object or the couch (Abstract).



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12. With respect to claims 12 and 18, Englund discloses the reception RF coil is one in number (Columns 5 and 6, lines 58-61 and 1-5 respectively).

13. With respect to claim 15, Englund discloses the position changing unit configured to move the couch every half of a length of the reception RF coil in the predetermined direction (as shown on Figures 1 and 4).

14. With respect to claim 16, Englund discloses the position changing unit configured to move the couch to a first couch position and a second couch position, a region to be imaged of the object located at the first couch position being shifted in part from a sensitivity distribution region of the reception RF coil, and the region located at the second couch position with the region being contained entirely in the sensitivity distribution region of the reception RF coil (as shown on Figures 1 and 4).

Englund discloses the claimed invention as stated above in paragraphs 3-14 except for the system further including instruction unit configured to instruct a contrast agent to be injected into the object when the couch is located at the second position. However, Wang discloses instruction unit configured to instruct a contrast agent to be injected into the object when the couch is located at the second position (Column 7, lines 22-36, Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Englund's MRI system with Wang's teachings of using a contrast agent for the purpose of improving the image quality by adding contrast to the image for differentiating the different aspects of the area examined.

15. With respect to claim 17, see rejection of claims 11 and 16 above.

16. With respect to claim 19, see rejection of claim 11 and 16 above.

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17. With respect to claims 21 and 33, Englund discloses the reception RF coil comprises a plurality of RF coils (Column 4, lines 27-45).

18. With respect to claim 26, Englund discloses the reception coil is fixed to the magnet (Figures 1 and 4).

19. With respect to claim 30, see rejection of claims 11 and 6 above.

### ***Response to Arguments***

20. Applicant's arguments with respect to claims 2-37 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art cited in the PTO 892 attached discloses unfolding procedures.

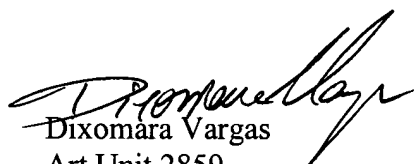
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (571) 272-2252.

The examiner can normally be reached on 8:00 am. to 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dixomara Vargas  
Art Unit 2859  
September 6, 2004



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800